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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1.   (Original) A method of detecting one of a set of preamble sequences in a spread signal comprising the steps of:

(a) correlating the received spread signal with sequences of a first orthogonal Gold code (OGC) set in accordance with a first fast transform to provide a preamble signal;

(b) correlating the preamble signal with the set of preamble sequences in accordance with a second fast transform to generate a set of index values;

(c) forming a decision statistic based on the set of index values; and

(d) selecting, as the detected one of the set of preamble sequences, a preamble sequence corresponding to the decision statistic.

2.   (Original) The invention as recited in claim 1, wherein, for step (a), the first fast transform method is a fast orthogonal Gold code transform (FOGT) comprising the steps of

1) multiplying the received spread signal with a first sequence vector and a forward permutation vector to generate a permuted sequence signal, wherein:

the first OGC set is generated from the first sequence vector and a cyclic shift matrix of a second sequence vector, and the forward permutation vector maps between i) the cyclic shift matrix and ii) a matrix of Walsh-Hadamaard sequences; and

2) applying the fast Hadamaard transform to the permuted sequence signal to generate a set of correlated signals, the preamble signal selected as one of the set of correlated signals based on a predetermined decision criterion.

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1   3.   (Original) The invention as recited in claim 1, wherein:

2   for step (b), the set of preamble sequences are selected from a second OGC set

3   formed from first and second sequence vectors, the second OGC set generated from the

4   first sequence vector and a cyclic shift matrix of a second sequence vector; and wherein

5   the second fast transform is a fast orthogonal Gold code transform (FOGT)

6   comprising the steps of

7   1) multiplying the preamble signal with a first sequence vector and a

8   forward permutation vector to generate a permuted preamble signal, the forward

9   permutation vector mapping between i) the cyclic shift matrix and ii) a matrix of

10   Walsh-Hadamaard sequences, and

11   2) applying the fast Hadamaard transform to the permuted preamble signal

12   to generate the set of index values.

1   4.   (Original) The invention as recited in claim 1, wherein, for step (b), the set

2   of preamble sequences are selected from set of Walsh-Hadamaard sequences, and the

3   second fast transform is a fast Hadamaard transform.

1   5.   (Original) The invention as recited in claim 1, wherein, for step (a), the

2   received spread signal is a burst of a random-access channel in a code-division, multiple-

3   access communication system.

1   6.   (Original) The invention as recited in claim 1, wherein step (c) comprises

2   the steps of:

3   1) forming an initial decision statistic based on the relative maximum index of the

4   set of index values;

5   2) selecting the signal generated by the preamble sequence combined with the

6   preamble signal corresponding to the initial decision statistic;

7   3) adjusting, in one or more of amplitude and phase, the signal selected in step 2);

8   and

9   4) forming the decision statistic based on the adjusted signal.

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1   7.   (Original) The invention as recited in claim 6, wherein step (c3) adjusts
2 the selected signal by estimating a channel response from the preamble signal, forming a
3 de-rotation signal from the preamble signal, and combining the de-rotation signal with the
4 preamble signal for coherent sequence detection.

1   8.   (Original) The invention as recited in claim 6, wherein step (c2) employs
2 the initial decision statistic to locally generate a corresponding preamble sequence, the
3 locally generated preamble sequence being combined with the preamble signal for
4 coherent sequence detection.

1   9.   (Original) A method of detecting one of a set of preamble sequences in a
2 spread signal comprising the steps of:

3   (a) correlating the received spread signal with a set of orthogonal sequences to
4 provide a preamble signal;

5   (b) correlating the preamble signal with one or more preamble sequences of an
6 orthogonal Gold code (OGC) set in accordance with a fast transform to generate a set of
7 index values;

8   (c) forming a decision statistic based on the set of index values; and

9   (d) selecting, as the detected one of the set of preamble sequences, a preamble
10 sequence corresponding to the decision statistic.

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1   10.   (Original) The invention as recited in claim 9, wherein:

2   for step (b), each preamble sequence is selected from the OGC set formed from

3   first and second sequence vectors, wherein the OGC set is generated from the first

4   sequence vector and a cyclic shift matrix of a second sequence vector; and wherein

5   the fast transform is a fast orthogonal Gold code transform (FOGT) comprising

6   the steps of

7   1) multiplying the preamble signal with a first sequence vector and a forward

8   permutation vector to generate a permuted preamble signal, the forward permutation

9   vector mapping between i) the cyclic shift matrix and ii) a matrix of Walsh-Hadamaard

10   sequences; and

11   2) applying the fast Hadamaard transform to the permuted preamble signal to

12   generate the set of index values.

1   11.   (Original) A preamble detector for detecting one of a set of preamble

2   sequences in a spread signal, the preamble detector comprising:

3   a first correlator correlating the received spread signal with sequences of a first

4   orthogonal Gold code (OGC) set in accordance with a first fast transform to provide a

5   preamble signal;

6   a second correlator correlating the preamble signal with the set of preamble

7   sequences in accordance with a second fast transform method to generate a set of index

8   values;

9   a circuit forming a decision statistic based on the set of index values; and

10   a selector selecting, as the detected one of the set of preamble sequences, a

11   preamble sequence corresponding to the decision statistic.

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1   12.   (Original) The invention as recited in claim 11, wherein the first fast

2   transform is a fast orthogonal Gold code transform (FOGT), the first OGC set is

3   generated from a first sequence vector and a cyclic shift matrix of a second sequence

4   vector, and the forward permutation vector maps between i) the cyclic shift matrix and ii)

5   a matrix of Walsh-Hadamaard sequences; and wherein:

6   the first correlator comprises:

7   a multiplier multiplying the received spread signal with the first sequence

8   vector and a forward permutation vector to generate a permuted sequence signal;

9   and

10   a combiner applying the fast Hadamaard transform to the permuted

11   sequence signal to generate a set of correlated signals, the preamble signal

12   selected as one of the set of correlated signals based on a predetermined decision

13   criterion.

1   13.   (Original) The invention as recited in claim 11, wherein:

2   the set of preamble sequences is selected from a second OGC set formed from

3   first and second sequence vectors, the second OGC set generated from the first sequence

4   vector and a cyclic shift matrix of a second sequence vector; and the second fast

5   transform is a fast orthogonal Gold code transform (FOGT); and wherein:

6   the second correlator comprises:

7   a multiplier multiplying the preamble signal with a first sequence vector

8   and a forward permutation vector to generate a permuted preamble signal, the

9   forward permutation vector mapping between i) the cyclic shift matrix and ii) a

10   matrix of Walsh-Hadamaard sequences, and

11   a combiner applying the fast Hadamaard transform to the permuted

12   preamble signal to generate the set of index values.

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  1   14.   (Original) The invention as recited in claim 11, wherein the set of

2 preamble sequences is selected from a set of Walsh-Hadamaard sequences, and the

3 second fast transform is a fast Hadamaard transform.

  1   15.   (Original) The invention as recited in claim 11, wherein the received

2 spread signal is a burst of a random-access channel in a code-division, multiple-access

3 communication system.

  1   16.   (Original) The invention as recited in claim 11, wherein the circuit

2 forming the decision statistic comprises:

3   a first magnitude detector forming an initial decision statistic based on the relative

4 maximum index of the set of index values;

5   a signal selector selecting the signal generated by the preamble sequence

6 combined with the preamble signal corresponding to the initial decision statistic;

7   a coherent detector adjusting, in one or more of amplitude and phase, the signal

8 selected in step 2); and

9   a second magnitude detector forming the decision statistic based on the adjusted

10 signal.

  1   17.   (Original) The invention as recited in claim 16, wherein the coherent

2 detector includes a channel estimator for i) estimating a channel response from the

3 preamble signal, and ii) forming a de-rotation signal from the preamble signal, and a

4 combiner for combining the de-rotation signal with the preamble signal for coherent

5 sequence detection.

  1   18.   (Original) The invention as recited in claim 16, wherein the coherent

2 detector includes a sequence generator, the sequence generator employing the initial

3 decision statistic to locally generate a corresponding preamble sequence; and a combiner

4 combining the locally generated preamble sequence with the preamble signal for coherent

5 sequence detection.

  1   19.   (Original) The invention as recited in claim 11, wherein the preamble

2 detector is embodied in an integrated circuit.

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1   20.   (Original) A preamble detector for detecting one of a set of preamble

2   sequences in a spread signal comprising the steps of:

3   a first correlator correlating the received spread signal with a set of orthogonal

4   sequences to provide a preamble signal;

5   a second correlator correlating the preamble signal with one or more preamble

6   sequences of an orthogonal Gold code (OGC) set in accordance with a fast transform to

7   generate a set of index values;

8   a circuit forming a decision statistic based on the set of index values; and

9   a selector selecting, as the detected one of the set of preamble sequences, a

10   preamble sequence corresponding to the decision statistic.

1   21.   (Original) The invention as recited in claim 20, wherein:

2   each preamble sequence is selected from the OGC set formed from first and

3   second sequence vectors, wherein the OGC set is generated from the first sequence vector

4   and a cyclic shift matrix of a second sequence vector and the fast transform is a fast

5   orthogonal Gold code transform (FOGT); and wherein

6   the second correlator comprises:

7   a multiplier multiplying the preamble signal with a first sequence vector and a

8   forward permutation vector to generate a permuted preamble signal, the forward

9   permutation vector mapping between i) the cyclic shift matrix and ii) a matrix of Walsh-

10   Hadamaard sequences; and

11   a combiner applying the fast Hadamaard transform to the permuted preamble

12   signal to generate the set of index values.

1   22.   (Original) The invention as recited in claim 20, wherein the preamble

2   detector is embodied in an integrated circuit.

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1   23.   (Original) A computer-readable medium having stored thereon a plurality

2   of instructions, the plurality of instructions including instructions which, when executed

3   by a processor, cause the processor to implement a method of detecting one of a set of

4   preamble sequences in a spread signal, the method comprising the steps of:

5   (a) correlating the received spread signal with sequences of a first orthogonal Gold

6   code (OGC) set in accordance with a first fast transform to provide a preamble signal;

7   (b) correlating the preamble signal with the set of preamble sequences in

8   accordance with a second fast transform to generate a set of index values;

9   (c) forming a decision statistic based on the set of index values; and

10   (d) selecting, as the detected one of the set of preamble sequences, a preamble

11   sequence corresponding to the decision statistic.

1   24.   (Original) The invention as recited in claim 23, wherein, for step (a), the

2   first fast transform method is a fast orthogonal Gold code transform (FOGT) comprising

3   the steps of

4   1) multiplying the received spread signal with a first sequence vector and a

5   forward permutation vector to generate a permuted sequence signal, wherein:

6   the first OGC set is generated from the first sequence vector and a cyclic

7   shift matrix of a second sequence vector, and the forward permutation vector

8   maps between i) the cyclic shift matrix and ii) a matrix of Walsh-Hadamaard

9   sequences; and

10   2) applying the fast Hadamaard transform to the permuted sequence signal to

11   generate a set of correlated signals, the preamble signal selected as one of the set of

12   correlated signals based on a predetermined decision criterion.

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1   25.   (Original) The invention as recited in claim 23, wherein:

2   for step (b), the set of preamble sequences are selected from a second OGC set

3   formed from first and second sequence vectors, the second OGC set generated from the

4   first sequence vector and a cyclic shift matrix of a second sequence vector; and wherein

5   the second fast transform is a fast orthogonal Gold code transform (FOGT)

6   comprising the steps of

7   1) multiplying the preamble signal with a first sequence vector and a

8   forward permutation vector to generate a permuted preamble signal, the forward

9   permutation vector mapping between i) the cyclic shift matrix and ii) a matrix of

10 Walsh-Hadamaard sequences, and

11   2) applying the fast Hadamaard transform to the permuted preamble signal

12 to generate the set of index values.

1   26.   (Original) A computer-readable medium having stored thereon a plurality

2   of instructions, the plurality of instructions including instructions which, when executed

3   by a processor, cause the processor to implement a method of detecting one of a set of

4   preamble sequences in a spread signal, the method comprising the steps of:

5   (a) correlating the received spread signal with a set of orthogonal sequences to

6   provide a preamble signal;

7   (b) correlating the preamble signal with one or more preamble sequences of an

8   orthogonal Gold code (OGC) set in accordance with a fast transform to generate a set of

9   index values;

10   (c) forming a decision statistic based on the set of index values; and

11   (d) selecting, as the detected one of the set of preamble sequences, a preamble

12 sequence corresponding to the decision statistic.

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1   27.   (Original) The invention as recited in claim 26, wherein:

2   for step (b), each preamble sequence is selected from the OGC set formed from

3   first and second sequence vectors, wherein the OGC set is generated from the first

4   sequence vector and a cyclic shift matrix of a second sequence vector; and wherein

5   the fast transform is a fast orthogonal Gold code transform (FOGT) comprising

6   the steps of

7   1) multiplying the preamble signal with a first sequence vector and a forward

8   permutation vector to generate a permuted preamble signal, the forward permutation

9   vector mapping between i) the cyclic shift matrix and ii) a matrix of Walsh-Hadamaard

10 sequences; and

11   2) applying the fast Hadamaard transform to the permuted preamble signal to

12 generate the set of index values.

28.   (Canceled)

29.   (Canceled)